Completed Pollution Prevention Project Case Study

United States Department of Energy
Office of Environmental Management
Fact Sheet

Dry Machining of Plutonium Parts

Los Alamos National Laboratory

Original Problem

In the past LANL used freon as the lubricant for machining plutonium parts. Different amounts of freon were used each year according to production needs. When it became illegal to manufacture or import freon in the United States, a new process had to be developed for machining plutonium parts since LANL did not want to use cutting oil as Rocky Flats had done.

The Project Solution

The dry machining process took about 18 months to perfect. New tools, procedures, machining parameters, and airtight glove boxes had to be developed. The airtight glove boxes are filled with argon or nitrogen to create a very low-oxygen environment. An alarm is triggered once the concentration of oxygen reaches 2%.

Value of Improvement

Unlike the standard wet machining process, the dry machining process creates no hazardous waste at all. Since no liquid touches the plutonium part now, researchers can be confident that no chemical reactions or changes are taking place on the surface of the plutonium part. Freon, a substance that contributes to the depletion of the stratospheric ozone layer, is no longer used in the machining process.

Lifecycle Waste Reduction	
Lifecycle Waste Reduction	Varies
Commencement Date	1987
Project Useful Life (Years)	Indefinite

DOE Monetary Benefits	
Total Project Cost	NA
Lifecycle Savings	Varies
Return on Investment	NA

Benefits At-A-Glance

- The dry machining process generates no hazardous waste.
- No chemical reactions take place on the surface of the plutonium parts being machined.
- Freon is no longer used for lubrication, eliminating a source of this substance that contributes to the degradation of the stratospheric ozone layer.

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Summary Data	
Priority Area:	Waste Minimization Projects
Project Type:	Source Reduction
Total Project Cost:	NA
Lifecycle Savings:	Varies from year to year - cost of freon that was previously used in the machining process.
Implementing Group:	NMT-5
Benefiting Group:	NMT-5
Useful Life Years:	Indefinite
Return on Investment:	NA
Lifecycle Waste Reduction:	Varies from year to year - amount of freon that was previously used in the machining process.
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